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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/620,675

07/15/2003

David Punsalan

200210251-1

9644

22879 7590 12/21/2006  
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EXAMINER

YUAN, DAH WEI D

ART UNIT

PAPER NUMBER

1745

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

12/21/2006

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/620,675	<b>Applicant(s)</b> PUNSALAN ET AL.	
	<b>Examiner</b> Dah-Wei D. Yuan	<b>Art Unit</b> 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 October 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 and 55-67 is/are pending in the application.
- 4a) Of the above claim(s) 66 and 67 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 and 55-65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>10182006</u> . | 6) <input type="checkbox"/> Other: _____  |

**SYSTEM AND A METHOD FOR MANUFACTURING AN ELECTROLYTE  
USING ELECTRODEPOSITION**

Examiner: Yuan

S.N. 10/620,675

Art Unit: 1745

December 12, 2006

**Detailed Action**

1. The Applicant's amendment filed on October 25, 2006 was received. Claims 10,16 were amended. Claims 55-67 were added.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on July 25, 2006.

***Election/Restrictions***

3. Newly submitted claims 66,67 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: The subject matter of aforementioned claims is "a method of manufacturing an electrolyte comprising depositing charge polymeric electrolyte particles on a substrate by electrophoretic deposition and subsequently depositing additional charge polymeric electrolyte particles on the substrate by electrolytic deposition", which is a distinct species from the "a method of manufacturing an electrolyte comprising coupling a substrate to a charge electrode and electrodepositing a polymeric electrolyte on the substrate" as recited in the original claims.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution

on the merits. Accordingly, claims 66,67 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Claim Rejections - 35 USC § 103***

4. Claims 1,2,4-18,55,57,58,61-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schucker (US 2002/0172871 A1) in view of Takeuchi et al. (US 2001/0014420 A1) as evidenced by Tanabe et al. (US 5,002,647).

With respect to claims 1,4,6,7,11-13,17,18,55,57,58,62,63, Schucker teaches a method of manufacturing a composite electrolyte comprising coupling a porous substrate to an electrode and applying, via electrophoretic deposition, an ionic conductive composition on said substrate. The composition encompasses NASICON ( $\text{Na}_3\text{Zr}_2\text{Si}_2\text{PO}_{12}$ ). See Paragraphs 31-33. However, Schucker do not teach specifically teach the ionic conductive composition is a polymeric electrolyte, such as a perfluorosulfonate ionomers. Takeuchi et al. teach an ionic conductive material for use as a membrane in a fuel cell can be an inorganic compound such as NASICON or a polymeric compound, such as Nafion (a perfluorosulfonate ionomers material). See abstract, Paragraph 118. Therefore, it would have been obvious to one of ordinary skill in the art to substitute a perfluorosulfonate ionomers for a NASICON as the electrolyte on the porous substrate of Schucker, because Nafion and NASICON are considered functionally equivalent ionic conductive material. It is also recognized in the art that the electrophoretic deposition is an electrodeposition process as evidenced by Tanabe. See Abstract, Column 1, Lines 6-55.

With respect to claim 2, the porous substrate, such as yttria-stabilized zirconia, is an ionic conductive material.

With respect to claim 5,10,16,61, it is well known in the art that the electrophoretic deposition involves a starting material for the solid electrolyte in a solvent system, applying an electric field between an anode and a cathode provided in the solvent system, and thus causing the material to be deposited on the surface of a substrate connected to the cathode terminal (charged electrode). See Tanabe et al., Column 1, Lines 6-55.

With respect to claims 8,9,64,65, the disclosure of Schucker and Takeuchi differs from Applicant's claims in that Schucker and Takeuchi et al. do not teach the removal of the deposited perfluorosulfonate ionomers by machining with a blade. Nevertheless, Schucker teaches the uniform thickness of the electrolyte is preferred. See Paragraph 52. Therefore, it would have been obvious to one of ordinary skill in the art to remove the excess perfluorosulfonate ionomer particles on the surface of the porous substrate by using a knife (blade), because Schucker teaches the uniform thickness of the electrolyte is preferred.

With respect to claims 14,15, Schucker teaches the use of titanium oxide, which is non-electrical conductive.

5. Claims 2-7,60-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schucker (US 2002/0172871 A1) in view of Takeuchi et al. (US 2001/0014420 A1) as applied to claims 1,2,4-18,55,57,58,61-65 above, and further in view of Tanabe et al. (US 5,002,647) and Steck et al. (US 6,258,861 B1).

With respect to claims 2,3,60-64, Schucker and Takeuchi disclose a method of manufacturing an electrolyte as described above in Paragraph 4. However, Schucker and Takeuchi do not disclose the use of an electrically conductive porous substrate. Tanabe et al. teach a method of preparing a solid electrolyte by means of electrophoresis (an electrodeposition process). The process involves a powder of a starting material for the solid electrolyte in a solvent system, applying an electric field between an anode and a cathode provided in the solvent system, and thus causing the powder to be deposited on the surface of a substrate connected to the cathode terminal (charged electrode). Tanabe et al. teach the cathode can be selected from the group consisting of stainless steel, platinum plate,  $ZrO_2$  and La-Sr-Co oxide. See Column 1, Lines 6-55, Column 4, Lines 16-29. Therefore, it would have been obvious to one of ordinary skill in the art to substitute a stainless steel for the yttria-stabilized zirconia as the substrate in the method disclosed by Schucker and Takeuchi, because Tanabe et al. teach zirconia and stainless steel are considered functionally equivalent substrates to be connected to the cathode in an electrophoresis process.

Moreover, Schucker, Takeuchi and Tanabe do not teach or suggest the use of a porous stainless steel substrate. Steck et al. teach the use of a porous substrate material in the fabrication of a composite membrane in which polymer can be impregnated into the porous substrate and provides better mechanical strength as a result of intimate contact between the two components. See Column 2, Lines 20-47. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate a porous stainless steel substrate onto the method of manufacturing an electrolyte of Schucker, Takeuchi and Tanabe, because Steck et al. teach the

use of a porous substrate to enhance the mechanical strength of the resulting electrolyte membrane.

With respect to claim 4, Schucker teaches the substrate is electrically coupled to the charge electrode. See Paragraphs 31-33.

With respect to claims 5,61, it is well known in the art that the electrophoretic deposition involves a starting material for the solid electrolyte in a solvent system, applying an electric field between an anode and a cathode provided in the solvent system, and thus causing the material to be deposited on the surface of a substrate connected to the cathode terminal (charged electrode). See Tanabe et al., Column 1, Lines 6-55.

With respect to claims 6,7,62-64, Takeuchi et al. teach an ionic conductive material for use as a membrane in a fuel cell can be a polymeric compound, such as Nafion (a perfluorosulfonate ionomers material). See abstract, Paragraph 118.

6. Claims 56,59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schucker (US 2002/0172871 A1) and Takeuchi et al. (US 2001/0014420 A1) as applied to claims 1,2,4-18,55,57,58,61-65 above, and further in view of Tanabe et al. (US 5,002,647).

Schucker and Takeuchi disclose a method of manufacturing an electrolyte as described above in Paragraph 4. However, Schucker and Takeuchi only disclose the use of such polymeric electrolyte in electrochemical cells. Tanabe et al. teach the preparation of membrane by an electrophoresis process. The resulting electrolyte membrane can be used in a fuel cell, which comprises an anode, a cathode and a solid electrolyte. See Column 1, Lines 6-13. Therefore, it

would have been obvious to one of ordinary skill in the art to use the polymeric electrolyte of Schucker and Takeuchi onto a fuel cell system, because Tanabe et al. teach the resulting solid electrolyte can be used in high temperature type fuel cells.

***Response to Arguments***

7. Applicant's arguments filed on October 25, 2006 have been fully considered but they are not persuasive.

*Applicant's principle arguments are*

*(a) Schucker and Takeuchi do not appear to teach or suggest an electrodepositioning process;*

*(b) claim 2 does not recite an ionic conductive material as indicated in the Office Action;*

*(c) the recitation "perfluorosulfonate ionomers particles" is not disclosed in the prior art.*

In response to Applicant's arguments, please consider the following comments.

(a) The combination of Schucker and Takeuchi references teach the use of an electrophoretic deposition process to fabricate a polymeric electrolyte on a substrate, which is coupled to a charged electrode as stated in Paragraph 4 above. It is recognized in the art that the electrophoretic deposition is an electrodeposition process as evidenced by Tanabe. See Abstract, Column 1, Lines 6-55;

(b) the recitation "conductive substrate" is interpreted to include both ionic and electric conductive substrates. Office personnel are to give claims their broadest reasonable



interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Also, limitations appearing in the specification but not recited in the claim are not read into the claim. See *In re Zletz*, 893F.2d 319, 321-22, 13 USPQ2d, 1320, 1322 (Fed. Cir. 1989);

(c) Takeuchi et al. teach an ionic conductive material for use as a membrane in a fuel cell can be a polymeric compound, such as Nafion™. It is well known in the fuel cell art that the Nafion™ is a perfluorosulfonate ionomers. See Niu et al. (US 2006/0188774 A1), Paragraph 65; Fleckner et al. (US 6,589,682 B1), Example 1; Naimer et al. (US 5,441,823), Column 2, Lines 13-22.

### ***Conclusion***

8. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on October 18, 2006 prompted the new ground(s) of rejection presented in this Office action. Also, Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a) and § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (571) 272-1295. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dah-Wei D. Yuan  
December 13, 2006



DAH-WEI YUAN  
PRIMARY EXAMINER